WHAT IS CLAIMED IS:

1. A PEALD (plasma enhanced atomic layer deposition) apparatus comprising:

a housing including a reaction chamber in which a deposition reaction is performed;

a rotary disk unit installed in the housing and provided with a plurality of susceptors for receiving wafers thereon so as to move the wafers;

a gas spray unit mounted on the upper end of the housing above the rotary disk unit, and provided with first reactive gas sprayers, second reactive gas sprayers and inert gas sprayers on a lower surface of a circular disk for spraying respective gases into the housing;

a gas feed unit connected to the gas spray unit for supplying first and second reactive gases and a purge gas into the housing;

a gas exhaust port formed around the rotary disk unit; and

a plasma generator for generating plasma to excite the second reactive gas.

2. The PEALD apparatus as set forth in claim 1,

wherein the first reactive gas sprayers, the second reactive gas sprayers and the inert gas sprayers of the gas spray unit are alternately arranged, and a purge gas exhaust port is formed at the central portion of the gas spray unit.

3. The PEALD apparatus as set forth in claim 1,

wherein each sprayer of the first reactive gas sprayers, the second reactive gas sprayers and the inert gas sprayers is made of a bar-shaped member with a predetermined length corresponding to the size of the wafer, includes through holes for spraying the respective gases formed in the central portion thereof along a longitudinal direction, and is opposite one another with respect to the center of the gas spray unit.

4. The PEALD apparatus as set forth in claim 1,

wherein the exciting of the second reactive gas by plasma generated from the plasma generator is performed at the outside or inside of the reactor.

5. The PEALD apparatus as set forth in claim 1, further comprising electronic showerhead including arm installed at both sides of each of the second reactive gas sprayers.

6. A PEALD (plasma enhanced atomic layer deposition) method using the PEALD apparatus of claim 1, comprising the steps of:

(a) mounting a plurality of wafers to be deposited with a thin film on susceptors of a rotary disk unit;

(b) maintaining a deposition temperature by controlling the temperature in the housing;

(c) vertically moving the rotary disk unit to a position corresponding to a gas spray unit;

(d) rotating the rotary disk unit; and

(e) depositing the thin film on the upper surfaces of the wafers by spraying a first reactive gas, a second reactive gas excited by plasma and an inert gas through spray holes of the gas spray unit.

7. The PEALD method as set forth in claim 6,

wherein the rotary disk unit has a rotational speed of 5rpm~100rpm, and the inside of the housing is maintained such that it has a pressure of 10mTorr~100Torr and a temperature of 25°C~500°C.

8. The PEALD method as set forth in claim 6,

wherein the first reactive gas is one selected from the group consisting of Al, Si, Ti, Ga, Ge, Co, Sr, Y, Zr, Nb, Ru, Ba, La, Hf, Ta, Ir, Pb, Bi, W, and their compounds.

9. The PEALD method as set forth in claim 6, wherein:

the second reactive gas comprises hydrogen gas so as to deposit a unit element thin film on the wafers, one selected from the group consisting of N_2 and NH_3 gases so as to deposit a nitride thin film on the wafers, one selected from the group consisting of oxygen and N_2O gases so as to deposit an oxide thin film on the wafers, and one

selected from the group consisting of methane, ethane, and propane gases so as to deposit a carbide thin film on the wafers; and

the second reactive gas is exited by plasma and then supplied into the reactor.

10. The PEALD method as set forth in claim 6, further comprising an in-situ plasma-processing step after the step (e).

11. The PEALD method as set forth in claim 10,

wherein a gas for using at the in-situ plasma-processing step is one selected from the group consisting of Ar, N_2, O_2 and H_2.

12. The PEALD method as set forth in claim 7, further comprising the step of clearing the wafers with a clearing gas excited by plasma so as to remove particles or foreign substances from the surfaces of the wafers, prior to the step (e).

13. The PEALD method as set forth in claim 7, further comprising an in-situ clearing step of removing the thin film deposited on the inside of the reactor using the plasma system.